

[0009] Yet another embodiment provides a level sensor for controlling fluid flow of a liquid in a liquid distillation system during distillation, the level sensor coupled with a variable flow valve controlled by the fluid level in the system.

[0010] Yet another method for removing contaminants from water comprises driving an electric generator by means of a thermal cycle engine for generating electrical power capacity, the thermal cycle engine including a burner for combusting a fuel, employing at least a portion of the electrical power capacity of the electric generator for powering a water purification unit, supplying source water to an input of the water purification unit, conveying heat output of the thermal cycle engine for supplying heat to the water purification unit to reduce the amount of electrical power required to purify the water. Further embodiments may additionally comprise one or all of transferring heat from an exhaust gas of the burner to source water, heating an enclosure surrounding the water purification unit to reduce thermal loss, vaporizing untreated water, and condensing vaporized water into distilled water product.

[0011] Another embodiment employs a backpressure regulator comprising a hinged arm having a closed position and a movable stop shaped to cover a port connected to a pressurized conduit, the stop being held by a retainer attached to the arm, and the stop being positioned adjacent to the port when the arm is in the closed position, wherein the arm is away from the closed position when the pressure conduit exceeds a set point, and the arm is in the closed position when the pressure in the conduit is less than the set point.

[0012] Additional advantages and specific aspects of the system will be more readily ascertained from the drawings and the accompanying detailed description of the preferred embodiments, below.

BRIEF DESCRIPTION OF THE DRAWINGS

[0013] The foregoing features of the invention will be more readily understood by reference to the following detailed description, taken with reference to the accompanying drawings, in which:

[0014] FIG. 1A is a conceptual flow diagram of a possible embodiment of the overall system designed in accordance with the present invention.

[0015] FIG. 1B is a schematic block diagram of a power source for use with the system shown in FIG. 1A in accordance with an embodiment of the invention.

[0016] FIG. 2 shows the component power unit and water purification unit in accordance with a preferred embodiment of the present invention.

[0017] FIG. 3 is a schematic block diagram of an auxiliary power unit for providing electrical power and heat for water purification in accordance with the present invention.

[0018] FIG. 4 is a schematic overview of an integral power unit/water purification system in accordance with an embodiment of the present invention.

[0019] FIG. 5A is a cross-sectional and top view of a rotor and stator in accordance with a particular embodiment showing the support structure for the input, the vanes and chambers between the vanes, and the rotating drive shaft.

[0020] FIG. 5B is a side top view of a rotor and stator corresponding to the embodiment shown in FIG. 5A, show-

ing the support structures for the input and output, the vanes, the eccentric configuration within the housing unit, and the drive shaft.

[0021] FIG. 5C is a top view of a rotor and stator corresponding to the embodiment shown in FIGS. 5A and 5B, showing support structures for input and output, the vanes, the eccentric configuration within the housing unit, and the drive shaft.

[0022] FIG. 5D is a cross-sectional view of a rotor and stator corresponding to the embodiment shown in FIGS. 5A, 5B, and 5C showing vanes, drive shaft, and bearings.

[0023] FIG. 6A is a schematic diagram of a liquid ring pump in accordance with a specific embodiment of the present invention.

[0024] FIG. 6B is a top view of a rotor in accordance with an embodiment of the present invention showing multiple vanes and chambers between the vanes, and intake and exit holes in each individual chamber.

[0025] FIG. 7A is further detail of a liquid ring pump in accordance with a specific embodiment of the present invention showing the stationary intake port and the rotating drive shaft, rotor and housing unit.

[0026] FIG. 7B is a view of a seal which may be present between the stationary and rotor sections of a liquid ring pump in accordance with a specific embodiment of the present invention, separating the intake orifice from the exit orifice.

[0027] FIG. 8 is a cross-sectional view of a liquid ring pump according to an embodiment of the present invention, showing a capacitive sensor.

[0028] FIG. 9 is a cross-sectional view of a liquid ring pump according to an embodiment of the present invention showing the eccentric rotor, rotor vanes, drive shaft with bearings, the rotatable housing unit for the liquid ring pump, the fixed housing, and the cyclone effect and resulting mist and water droplet elimination from the steam.

[0029] FIG. 10 is a cross-sectional view of a particular embodiment of a liquid ring pump in accordance with the present invention, showing a hermetically sealed motor rotor and magnets that are housed within the pressure and fluid boundary of the system, the drive shaft, rotor, and rotatable housing wherein water droplets are spun off and recycled back to the base water level of the pump, and a siphon pump for drawing water up into the main chamber of the pump from the lower reservoir.

[0030] FIG. 11 is a detailed view of the hermetically sealed motor rotor shown in FIG. 10.

[0031] FIG. 12A is a view of the external pump housing and motor housing for an embodiment in accordance with that of FIG. 10, showing steam input and output ports.

[0032] FIG. 12B is a cross-sectional view of FIG. 12A, showing the motor within its housing, the motor shaft and rotor, and the lower reservoir.

[0033] FIG. 12C is another cross-sectional view of FIG. 12A through a different plane, again showing the motor within its housing, the motor shaft and rotor, and the fluid line connecting to the lower reservoir, wherein the siphon pump is now visible.

[0034] FIG. 13 is a detailed cross-sectional view of the lower reservoir of FIG. 12C showing more clearly the siphon pump, the surrounding bearings, and fluid line.

[0035] FIG. 14A is a schematic of an overall system in accordance with an embodiment of the invention, showing the intake passing through a pump, into a heat exchanger,